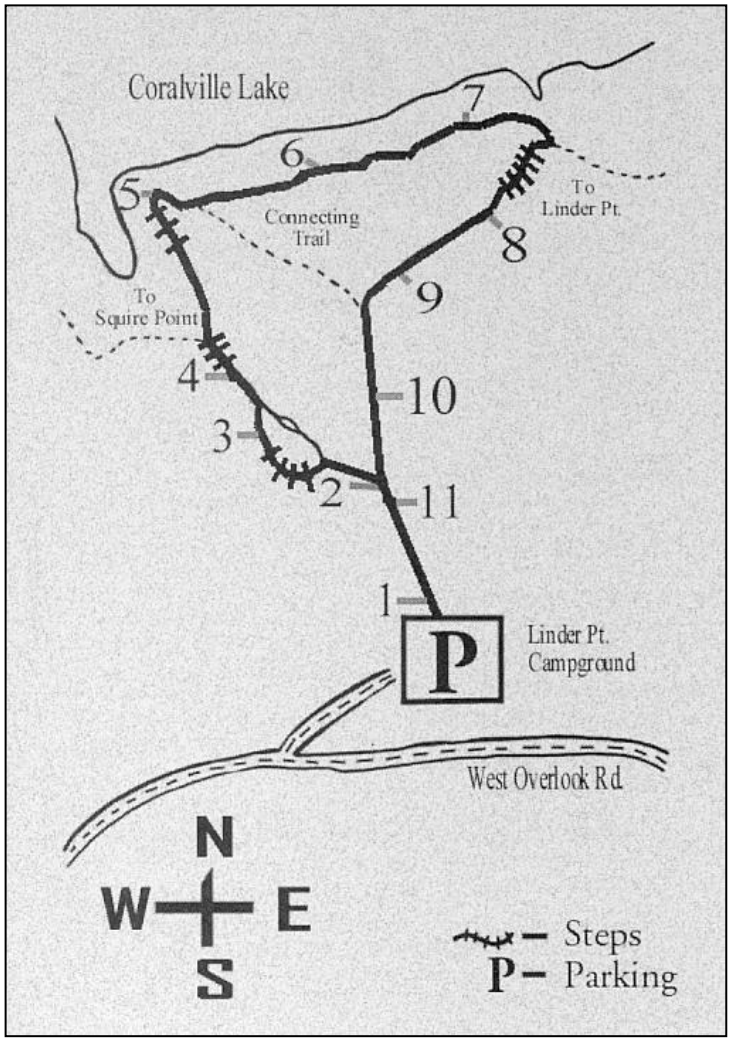
Woodpecker Nature Trail

The Woodpecker Nature Trail is a self-guided trail. Print this out and take it with you as you walk along the trail. Walking time is approximately 40 minutes for the average hiker.

Stop 1 - Poison Ivy (*Rhus radicans*)



"Leaflets Three, Quickly Flee! Berries White, Poisonous Site!" Wise words to live by if you're an outdoor enthusiast. Poison ivy is abundant in Iowa and much more widespread than its western cousin, poison oak. The plant can be easily identified most of the year because of its leaf arrangement. The leaf of a poison ivy plant is comprised of three leaflets, hence they popular saying. Identification may be complicated, however, because poison ivy may take the form of a shrubby plant, a vine, or just a "typical" freestanding plant. Regardless of the growth form, the leaf arrangement stays consistent.

All parts of the poison ivy plant are poisonous, even in the winter. Contact with the raw resin in the leaves, stems, and roots may cause a skin rash. A thorough scrubbing of the affected area with an oil solvent soap will wash away the resin before it causes irritation, if done immediately after contact. After scrubbing, rinse with cool water to close the skin pores. As sensitivity to the poison ivy resin varies with the individual, no treatment method is foolproof and the faster you can treat the affected area the better. Some people may develop a severe reaction to poison ivy, requiring them to seek medical assistance for treatment. The best prevention is to avoid the plant whenever possible and always wear proper hiking clothing that includes, long pants, long sleeved shirts, and durable hiking boots.

Poison ivy isn't the only danger you'll encounter on this trip. Root and rock exposures are also quite abundant and may be the cause of an ankle injury if you are not careful. Always be conscious of your surroundings and watch where you step. During wet or rainy weather you should also use caution as the trail has a tendency to become quite slick. Visitor safety is of utmost importance to us, and a close second to your safety is for you to have fun. We hope you enjoy your visit to Woodpecker Nature Trail.

Stop 2 - Eastern Red Cedar (*Juniperus virginiana*)

The Eastern Red Cedar is the most common evergreen native to the state of Iowa. The cedar can be identified by its scale-like leaves (as opposed to the needle-like leaves of other conifers) and its fibrous, stringy bark. During much of the summer, fleshy, blue-gray structures resembling berries can be seen on the tree. These structures are not berries, but modified cones used for reproduction. These berry-like cones differentiate cedars from other evergreens.

As a sun-loving species, the Eastern Red Cedar is most commonly found in areas that receive ample amounts of sunlight, such as a prairie or fence row. By knowing this simple fact and making a few keen observations, you can make a fairly accurate hypothesis as to what this area used to look like. For example, look around at the trees surrounding you at this point. Most of them are all about the same size in diameter (3-4 inches). Perhaps the reason for this is that they all started growing at the same time. There are a few large oaks and hickories scattered about, but for the most part, they are relatively sparse. Many of these trees have an "open grown" look, suggesting that at one time they were growing in a very sunny place.

So what does all this mean? Well, before there was the Coralville Dam this area used to be farmed. This particular area was used as pastureland. During that time the old oaks, hickories, and this cedar began to grow. After the US Army Corps of Engineers bought the land, however, the animals and fences were removed, and the forest you see around you now began to grow.

It is possible that most people just walk Woodpecker Nature Trail and take it for what it appears to be, just a walk in the woods. As you can see with the case of the Eastern Red Cedar, there is sometimes more than meets the eye. At Coralville Lake, we not only want to you just walk through nature, we want you to experience it.

Stop 3 - Forest Layers

Before descending the steps to the limestone outcrop, take time to observe the layers of the forest. Forests are composed of five layers: the canopy, the understory, the shrub layer, the herb or ground layer, and the forest floor. Sunlight is filtered out of each of these layers, leaving the forest floor with the least amount of sunlight available to grow.

As sunlight availability is the most limiting factor to forest plants, the canopy is the most influential layer of the forest. The size and numbers of plants in lower layers are dependent upon how dense or how sparse the canopy layer is. In other words, the denser the canopy, the less amount of living material, or biomass, there is below the canopy. A more open canopy allows for more biomass beneath.

The understory consists of shade-tolerant shrubs and trees that form a sub-canopy layer. In the event that the canopy would open up, trees in the understory may take over as canopy trees due to the increase in sunlight availability. The sub-canopy created by the understory further reduces the amount of sunlight available for plants in the lower layers. The understory is very similar to the shrub layer, which tends to grade into the understory, sometimes making it difficult to decipher where one layer ends and the other begins.

The herb, or ground layer consists of woodland wildflowers and all other such herbaceous plants. This layer is extremely dependent upon microclimatic conditions. In other words, subtle differences in moisture content, temperature, slope, sunlight exposure, and nutrient availability determine the type of vegetation that can grow here. Generally, biomass in the herb layer increases as sunlight availability increases.

The lowest layer, the forest floor, plays a vital role in forest succession. Because the forest floor is home to many small organisms, it is where most of the decomposition occurs. These organisms, whether they be fungi, mosses, bacteria, insects, etc., help to break down dead and decaying matter so it may be returned to the soil and recycled. As the forest floor receives the least amount of sunlight, it is very difficult for plants to grow. Consequently, plants found on the forest floor are very small and extremely shade tolerant.

Stop 4 - Sink Hole

Remember if you will back to the days of your youth when a building snow fort was almost an every day occurrence during the winter months. After you spent all winter digging out tunnels and rooms through big drifts, what happened in the springtime? As the temperatures started to rise the snow began to melt, eventually the weight of the snow over the tunnels and rooms was so heavy it could no longer support itself and it collapsed, creating a sinkhole. How is this relevant to this spot you might ask? Well, as rainwater falls to the earth, it picks up carbon dioxide from the air. This dissolved carbon dioxide and water mix to form weak carbonic acid, which can dissolve limestone. Eventually, this water becomes part of the groundwater system, at which point it can flow through the limestone bedrock, dissolving small amounts of limestone as it flows. After many years, caves may develop from this process. As the caves become bigger, and soil is eroded at the surface, the weight of the ceiling may overpower the carrying capacity of the walls, causing the ceiling to collapse, thus forming a sinkhole.

Most sinkholes, such as this one, are fairly small. However, sometimes sinkholes are quite large. In the past, people viewed such sinkholes as "natural" landfills. After all, the hole was already there and all that needed to be done was to fill it with garbage and cover it up. Knowing how sinkholes form, do you think sinkholes would make good landfills? Of course not! Because sinkholes are formed by flowing groundwater, dumping garbage into them is literally dumping garbage straight into your groundwater supply. This may be the same groundwater that you drink every day. Yuck!

Stop 5 - Limestone Outcrop

The rock exposed here is limestone. Limestone is formed from the remains of tiny marine plants and animals. When living, these plants and animals concentrated calcium carbonate in their skeletal tissues, and when they died, the calcium carbonate skeletons were left behind. This created lime mud that eventually transformed into limestone. The process can be observed today among the coral reefs in places like the Caribbean Sea. How does this relate to Iowa? Well, by studying processes that occur today, we can make hypothesis about what happened many years ago. With this understanding, it is believed that a shallow, tropical ocean once covered Iowa.

Evidence to support this can be seen in the form of fossils that can be found in this outcrop as well as the fossils in the Devonian Fossil Gorge that was uncovered during the flood of 1993. During the flood, five feet of limestone bedrock was eroded, exposing the fossil beds beneath. This erosion was due to the swift moving water. However, because of its makeup, limestone can also be easily eroded by rainwater. As rain falls through the air it picks up carbon dioxide, forming carbonic acid, which can dissolve limestone. In some instances, caves are formed such is the case with the caves in Maquoketa Caves State Park in Iowa.

Notice the difference in vegetation around the outcrop as opposed to the vegetation found in the forest. The most noticeable difference may be seen on the hillside. Here the herbaceous layer is thriving with numerous grasses and forbes. This difference in vegetation is due to sunlight availability. In the forest, sunlight is a rare commodity below the canopy, but on this hillside, there is no canopy so the grasses and forbes are abundant. As previously mentioned, microclimatic differences can have an impact on the vegetation. As you walk the trail, see if you can see any other areas where these microclimatic differences are affecting the vegetation.

Stop 6 - White Oak vs. Red Oak (*Quercus borealis* vs. *Quercus alba*)

Do you know how to tell the difference between the white oak and the red oak? The easiest way is to look at the shape of the leaves. When differentiating between red and white oak leaves there is one key character that can be used, the shape of the leaf's lobes. Take for example the red oak. Leaves of the red oak have pointed lobes, while white oak leaves have rounded lobes. An easy way to remember this is to imagine that the leaves were made of metal. If you poked yourself with a red oak leaf, the sharp metal point would pierce your skin, causing red blood to come out, reminding you of the red oak. The white oak leaf with its rounded lobes would not draw the red blood, making that the white oak leaf by default. Identifying the oaks by their leaves is fine when there are leaves on the tree, but what happens in autumn when the leaves fall from the tree? The bark of the two trees also differs in appearance. The bark of the red oak tree is thick and has deep grooves running through it. This type of bark is referred to as furrowed bark. The bark of the white oak, in contrast, is not really furrowed at all. The vertical grooves in the white oak are small and generally run parallel to each other. The horizontal grooves create a rectangular pattern in the bark.

Oaks produce a fruit called an acorn. The acorn is a valuable source of food for chipmunks, squirrels, white-tailed deer, and wild turkeys. Squirrels have been known to collect acorns in the fall and bury them for use in the winter. Some of these acorns are forgotten or never used and may wind up growing in the spring. Some oak trees you see along the trail may owe their existence to the squirrel. Native Americans living in Iowa were known to collect and store white oak acorns for use during the winter months as well. Red oak acorns are very bitter and not edible. The white acorns were ground and the bitter tasting tannic acid in them was removed by thoroughly leaching them with warm water. The starchy contents were then made into bread. Perhaps many years ago Native Americans were searching in this very spot along the Iowa River for acorns they could use for this very purpose.

Stop 7 - Dead Snag

Scattered throughout the forest are fallen trees and shrubs in various stages of decay or decomposition--reminders to us that death, as well as new life is essential in any biological community.

Plants and animals are continually dying in the forest community. Their remains are broken down, or decomposed, by many organisms including algae, bacteria, fungi, protozoa, soil mites, nematodes, and snails. These decomposers, along with producers (green plants) and consumers (animals that eat the producers and other animals), create a dynamic ecosystem in which organisms die, decompose, and then give rise to new life. In our culture, it is not uncommon to view death as a time of sadness and mourning, but in the forest, with death comes new life, life that is full of vigor and rich in diversity.

Generally, dead trees have more life than living trees. How can this be you may ask? Take, for example, a mature oak tree in the forest. Now this mature oak tree really doesn't have much living tissue when compared to its total mass. The only living tissue in this tree is a thin row of cells located just inside the bark known as the cambium layer, which also runs through the roots, and the leaves. In a mature tree, everything inside the cambium layer is dead. In conclusion, a mature, living tree is mostly made up of dead tissue. Once the tree dies, life begins to flourish. First, water begins to penetrate the bark and rot the wood. Before long, the decomposers (fungi, insects, mosses, etc.) move in. Shortly afterward, consumers move in to dine on the decomposers. One such consumer bears the name for which this trail has been named after. Not long after the death of the tree, complete micro-ecosystems may exist, thus providing the dead tree with more life than it had when it was living.

Stop 8 - The Learning Tree

Imagine if you will, two young saplings growing in very close proximity to each other on an open savanna hillside. The trees, having just broken the surface of the soil, their new shoots reaching longingly for the heavens, are in constant competition with each other for necessities of life--nutrients, water, sunlight, and space. Eventually, as the trees got taller and wider, they started to grow into each other until the two trees became one. As their branches got bigger and more spread out, the trees began to shade one another out. Each tree, trying desperately to get the maximum amount of sunlight possible, began twisting and turning until they found that spot. The outcome was spectacular. One tree had twisted to the east, catching the morning sun, while the other tree had twisted to the west, catching the afternoon sun. In this wonderful example, these two trees, now joined as one, had learned to share the basic essentials of life, thus allowing them both to survive.

The tree in front of you may or may not have the same story to tell. It is very likely that this tree is a product of phototropism, which is growth or movement in response to a source of light. This is evident in the twisting, which resulted in the one tracking the morning sun in the east, and the other tracking the afternoon sun in the west. There are other causes of unusual growth including lightning, disease, human abuse, and insect infestations. So is the tree in front of you the star of the previous story? We are not sure, but we'd sure like to think so. A story like that could provide us with a model we could all learn from.

Stop 9 - The Race

All right Nascar fans, here's the stop you've all been waiting for! Perhaps one of nature's most spectacular races is going on right here. In this race the winner doesn't walk away with millions of dollars in prize money. In this race, a race for survival, the winner simply gets to live. If you look up into the opening, you can see the remains of a black cherry tree. Not too many years ago, the top to that cherry tree was broken off, allowing more sunlight to penetrate the canopy. It is uncertain whether or not the tree was broken off by a lightning strike, a weak spot in the tree caused by insects or disease, or high winds. Regardless, the top of the tree came crashing down, sounding off one of nature's greatest races. All of the small trees in the shrub and understory layers took full advantage of this event. The winner of this race will be the tree (or trees) that grow the biggest and fastest, produce the broadest leaves, and shade out the others to either stunt their growth or kill them off entirely. It truly is a fight to the finish. So is life in nature. Perhaps some day the winner of this race will suffer the same fate as the black cherry and the process will start all over again.

Stop 10 - Forest Age

Just as every living organism goes through stages of life as it ages, so to does the forest. Baby forests are born when there is a large-scale disturbance and the existing forest, regardless of its age, is destroyed. Large-scale disturbances are rare and may include landslides, volcanic eruptions (which can cover entire forests with volcanic ash), fire, and of course, destruction by humans. Immediately after these forests are disturbed, the sun-loving plants begin to grow. These pioneer plants take advantage of the previously unavailable resources and grow very quickly. As time goes on, if conditions are favorable and the seeds are available, other plants that can tolerate the shade will begin to grow. As plants get taller and taller it becomes harder and harder for shade intolerant plants to grow. Eventually, as trees enter the mix, they begin to shade out the grasses and forbes and the forest floor begins to get darker and darker. As the plants grow and produce seeds, increased shade may inhibit these seeds from germinating. Therefore, young forests can be characterized by having a lot of plants in its herb, shrub, and understory layers, whereas mature, or old growth, forests are characterized by having thick canopies with relatively open herb, shrub, and understory layers and very shade tolerant species growing beneath the canopy.

Believe it or not, but the forest you're walking through right now is fairly young. Sure, there are some big old trees scattered about, but the rest of the trees are still juveniles. As mentioned at the Eastern Red Cedar, the relatively small diameter of their trunks and the fact that their trunks are all about he same size suggests that they started growing about same time; in this particular case, they started growing after the land ceased to be used as pastureland. This stage of the forest can be compared to a typical teenage boy. A teenager may have a lower voice and be allowed to drive a car, but that by no means makes him a man. The forest, just as the boy, may have certain characteristics that it shares with a mature forest, but it is far from mature.

As the forest ages, its appearance begins to change. As the trees grow larger, they prevent more sunlight from reaching the forest floor. Generally, the darker the forest, the older its age. As less and less sunlight is allowed through the canopy, fewer seeds are able to germinate. A forest

becomes mature at the point in time when new seeds fall to the ground but are unable to germinate in this extremely low-light environment. As more and more sunlight is taken up before it gets through the canopy, the subcanopy, shrub, and herb layers are shaded out. Consequently, a mature, old growth forest is characterized by having large trees creating a very dense canopy, which shades out most of the lower layers, resulting in the death and decay of much of these layers. Although there may be less biomass, or living stuff, below the canopy, the species diversity is extremely high and the interrelationships among species is very complex. There is less biomass because shade tolerant plants are generally small and reduced, allowing them to survive in low-light environments.

Can you guess what happens when one of these big old trees in the canopy layer dies? If a canopy layer tree dies, it may create an opening, which may allow more sunlight through the canopy, which may spark a mass germination of seeds in the seed bank in that particular opening, ultimately starting the race for survival. Disturbances happen continually in the forest. As trees fall from excessive winds, or die, or become diseased, patches are opened up across communities and the forest community attempts regain a stable equilibrium. This, however, is impossible. For this reason, naturalists refer to mature forests as old growth forests as opposed to climax forests, which may indicate a state of equilibrium. For the most part, however, old growth forests are very open below the canopy. Only plants that are extremely shade tolerant can tolerate the growing conditions in such a place. Old growth forests are the setting for many stories starting off with the ever-popular phrase, "Once upon a time, in the deep, dark, woods..."

Stop 11 - Reflection

Did you see or hear any wildlife along the trail today? It may be of no surprise to learn that most wildlife tends to stay away from humans, especially since we tend to be hasty and rather loud in our travels. Many times we could find ourselves surrounded by wildlife if we would only take the time to stop and observe. By making simple observations, we can also learn quite a bit about the natural world that surrounds us. In today's society, much of our learning is centered on textbooks and the classroom. We sometimes tend to focus more on what's in black and white print, rather that what we can see in full color all around us. Sometimes the best way to learn about nature is to experience it. For this last portion of the trail, the Corps of Engineers would like to invite you to take the time to utilize all of your senses to reflect on what you have experienced here today and to see if you can make some observations that may make the strange become familiar and the familiar to become strange.